

# Exploring Tablet PCs

Pine Crest School is not a technology school. We do not have a specific technology track; however, we maximize the use of technology to deliver the curriculum from PK to 12. For more than six years, our students have used laptop computers. For the past four, we have had all Grade 6–12 students using our wireless network. We have implemented a course management system and an intranet. Parents, students, teachers, and staff regularly log in to access community and academic information.

Tablet PCs have piqued the interest of the education world and schools have begun to explore them. Our implementation technology team was intrigued with this technology and decided to test a number of tablet models with teachers. With the support of the senior administration, we were able to purchase seven tablets of four different models. (*Editor's note:*

See The Four Tested on p. 17 for mini-reviews of the tablet PCs Pine Crest chose and Tablet Feature Chart on p. 18 for specifications on a number of tablets.)

## Tablets in the Classroom

Tablet PCs can be loaded with the same software programs as regular laptops. However, the tablets also have specialized software, commonly known as *ink-enabled* applications, that allow you to interact using a stylus on the screen. Many of these programs vary in subject areas and in grade levels and are available as free downloads from Microsoft. One powerful program allows students to practice fine motor control in a handwriting exercise. After the student traces the word, the letters form a picture of the traced word.

Older students can use Physics Illustrator, which enables them to draw shapes, connect them, apply

forces, and watch as the animation demonstrates the forces of physics.

The key to implementing any technology in education is software development. As more software is written, tablets will become indispensable in the educational setting. The implications for science and math departments are phenomenal. Math teachers can tell you how difficult it is to write formulas on a traditional laptop. A company called XThink created MathJournal (<http://www.xthink.com/MathJournal.html>), a simple ink-enabled editing program. MathJournal is an interactive program that provides a natural and intuitive environment for solving mathematical and engineering problems.

This software is among more than 100 programs with tablet functionality. As Microsoft makes a commitment to ink-enabled technology, more programs are becoming a standard part of the tablet. Windows

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**Subject:** Tablet PCs

**Grades:** PK–12 (Ages 4–18)

**Standards:** NETS•S 3; NETS•T II;  
NETS•A II (<http://www.iste.org/nets/>)

Journal helps teachers use tablets by enabling all Microsoft applications to be opened in an ink-enabled environment that lets teachers write directly on documents. This has great implications when the teacher is using the tablet with a traditional or wireless projector. When the presentation is completed, the teacher can save the marked document and send it to students. For instance, when a PowerPoint presentation is opened, the teacher can annotate directly on the slides.

With another useful ink-enabled application, One Note, teachers can keep, organize, and reuse notes on their tablet PCs. OneNote helps the teacher capture information in multiple ways and then organize

and use it according to their needs. In addition, One Note and Journal include handwriting recognition functionality.

### The Tablet Trial

We asked teachers to apply to become tablet users. Teachers had to let us know why they were good candidates and also how they would implement this technology in the classroom. All the teachers were enthusiastic, and

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## The Four Tested

It was important for us to try various tablet PCs to see which models worked best in an educational setting. We looked at many of the models available and set the criteria for selection. The criteria included the need for the tablet to have an IEEE 802.11g wireless card with Intel Pentium M Processor with Intel Centrino Mobile Technology. The power management and resulting long battery life of the Pentium M/Centrino technology was very important.

Other factors we gave consideration to included weight, screen size, cost, availability, cost of accidental damage coverage, battery life, internal or external CD/DVD, RAM quantity, and hard disk size.

Tablets can be categorized into the following groups: slates, convertibles/hybrids, and ruggedized. We concluded that the ruggedized models cost too much for our uses, so we selected slates and convertible/hybrids to test. Essentially, a slate has no built in keyboard, although they can connect to a standard USB keyboard. Conversely, a hybrid is as the name suggests, essentially a traditional laptop with the added capabilities of an interactive screen.

We chose three convertible models and one slate. Teachers were delighted with whichever model they were given. All the teachers chosen were strong laptop computer users before they got a tablet and were very keen to explore with this new technology.

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## Tablet Feature Chart

Product	Acer TravelMate C300	Averatec C3500	Fujitsu Stylistic ST5020	Fujitsu LifeBook T4010	Gateway M275	HP Compaq TC1100
						
Base Price	\$1,699	\$1,349	\$2,099	\$2,099	\$1,799	\$2,299
Type	Convertible	Convertible	Slate	Convertible	Convertible	Convertible
CPU	Intel Pentium M 1.5 GHz	AMD Athlon XP-M 2200	Intel Pentium M 1.1 GHz	Intel Pentium M 1.6 GHz	Intel Pentium M 1.6 GHz	Intel Pentium M 1.0 GHz
Weight (lbs)	6.2	5.5	3.5	4.7	5.7	4.0
Manufacturer's Estimated Battery Life	~7 hours	3+ hours	~9 hours	~5 hours	4+ hours	~3 hours
Hard Drive (base size GB)	30	60	40	40	40	40
Screen Size	14.1	12.1	12.1	12.1	14.1	10.4
Graphics	Intel Extreme 2	Unknown	Intel Extreme 2	Intel Extreme 2	Intel Extreme 2	nVidia GeForce 4 Go 420
RAM (MB base/max.)	256/2048	512/1024	256/2048	256/2048	256/1024	512/2048
Wireless Type (802.11)	b	g	b/g	b/g	b	b
Ports	Firewire, 2 USB 2.0, 4-in-1 memory card reader, Infrared	4 USB 2.0, Type II PC card	Firewire, 2 USB 2.0, Type II PC card, SD, infrared	Firewire, 2 USB 2.0, Type II PC card, SD	Firewire, 2 USB 2.0, 4-in-1 memory card reader, Type II card	2 USB 2.0, SD, Type III Card
Integrated Features	DVD/CD-RW				DVD/CD-RW	
Contact	<a href="http://www.acer.com">http://www.acer.com</a>	<a href="http://www.averatec.com">http://www.averatec.com</a>	<a href="http://www.fcpa.com">http://www.fcpa.com</a>	<a href="http://www.fcpa.com">http://www.fcpa.com</a>	<a href="http://www.gateway.com">http://www.gateway.com</a>	<a href="http://h18000.www1.hp.com/products/tabletpc/">http://h18000.www1.hp.com/products/tabletpc/</a>

HP Compaq TC4200	Motion Computing M1400	Toshiba Portégé M200	Toshiba Satellite R15	Viewsonic V1250S	Viewsonic V1100	TDV Visionary V800XPT
						
\$1,949	\$1,999	\$1,949	\$1,599	\$1,995	\$1,880	\$955
Convertible	Slate	Convertible	Convertible	Convertible	Slate	Slate
Intel Pentium M 1.7 GHz	Intel Pentium M 1.1 GHz	Intel Pentium M 1.7 GHz	Intel Pentium M 1.6 GHz	Intel Pentium M 1 GHz	Intel Pentium III-M 866 MHz	Transmeta Crusoe 800 MHz
4.5	3.6	4.6	6.1–6.5	3.9	3.4	2.6
4.75 hours	~4 hours	4.34 hours	~4 hours	~3 hours	Not listed	~3 hours
40	20	40	60	30	20	30
12.1	12.1	12.1	14.1	12.1	10.4	8.4
Intel Accelerator 900	Intel Extreme 2	nVidia GeForce FX 5200	Intel Extreme 2	Intel 4X AGP	Intel 4X AGP	SVGA
512/2048	256/2048	512/2048	512/2048	256/2048	256/768	256/512
b/g	b/g	b	b/g	b/g	b	b
Firewire, 2 USB 2.0, SD	Firewire, 2 USB, Type II PC card	Firewire, 2 USB, Type II PC card	Firewire, 2 USB 2.0, SD	Firewire, 2 USB 2.0, Cardbus Type II, SD	Firewire, 2 USB, Type II PC card, Type II Compact Flash	2 USB 2.0, VGA
DVD/CD-RW			DVD/CD-RW		Camera	CCD camera
<a href="http://h18000.www1.hp.com/products/tabletpc/">http://h18000.www1.hp.com/products/tabletpc/</a>	<a href="http://www.motioncomputing.com">http://www.motioncomputing.com</a>	<a href="http://www.toshibadirect.com">http://www.toshibadirect.com</a>	<a href="http://www.toshibadirect.com">http://www.toshibadirect.com</a>	<a href="http://www.viewsonic.com">http://www.viewsonic.com</a>	<a href="http://www.viewsonic.com">http://www.viewsonic.com</a>	<a href="http://www.tdvision.com">http://www.tdvision.com</a>

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### Toshiba Portégé M200

The Toshiba hybrid is powered by an Intel Pentium M 1.6 GHz processor with 512 MB of RAM, 12.1" TFT SXGA polysilicon display and 60 GB of hard drive storage. The RAM can be expanded to 2 GB.

Thanks to an nVidia GeForce Go5200 graphics chip with 32 MB of DDR video RAM, this tablet provides excellent video performance. Battery life is also quite long, averaging more than four hours. This is a very lightweight tablet providing full functionality as a laptop. We really liked the quality of the display on this model as it was crystal clear.

### HP Compaq TC1100

The HP hybrid is powered by an Intel Pentium M 1 GHz processor with 512 MB RAM. At four pounds, it was one of the smaller tablets we chose. It comes with an integrated 32 MB graphics card and PCI sound card. This tablet boasts extended battery life over previous models. The display on this model is slightly smaller (10.4") and seemed somewhat more fragile than the other models tested. One of the advantages of the HP is that it uses hot docking, so you can easily disconnect your tablet from the docking station and not lose data.



### Motion Computing M1300

The Motion M1300 is a slate model built around Intel's ultra low voltage 900 MHz Pentium M processor. (*Editor's note:* The M1300 has been supplanted by the M1400.) One of the obvious advantages of a slate is reduced weight. The M1300 weighs only three pounds. The battery life is only fair at approximately three hours of constant use. It can be upgraded to include 1 GB of RAM. The M1300 has a relatively large 12.1" screen that is bright enough to light a room, possibly explaining the meager battery life. However, at some angles, the screen quality is not good, and for group projects, this model would probably not be the best choice. Although it does come with a mobile USB keyboard that can be attached for full laptop functionality, the optional docking station is highly recommended.



### Gateway M275

The Gateway is a hybrid with a larger screen (14.1" XGA TFT active matrix). We selected this model to be used by our graphic arts teacher. However, although the size of the screen is good for subjects such as graphic arts, this model weighs in at a substantial 5.7 pounds. Although heavy, it is the only model with an integrated CD-RW/DVD combo. This model easily transforms between a notebook and a tablet. It also provides great tablet/pen accuracy with its easy-to-use stylus. Additionally, despite the large screen and integrated optical media drive, the M275 still manages nearly four hours of battery life.



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we immediately formed a tablet users group. This group met and discussed the uses of tablets in the classroom and offered each other some amazing tips and tricks. Once you place tablet PCs with teachers, they certainly want to use them and not let them gather dust.

On a recent visit to Cincinnati Country Day School, students carried around Toshiba Portégé tablets. The director of technology at the school insisted that computer repairs had gone down since the change from laptop computers.

Eleanor Brown, a middle school language arts teacher, said "One of the advantages of a tablet PC is that, like a SmartBoard or a Mimeo, teachers can display materials on a projector, edit and alter these on the screen, and then return to the original material without erasing and rewriting. I teach the same class six times in a day, so this provides an advantage. In addition, I find that keeping students' attention with the tablet is easier. Because the pen allows me to highlight, circle, and otherwise indicate what I want the students to focus on, they have a visual cue as to what I am concentrating on."

For students who are accustomed to using a writing utensil, the pen and screen approach of a tablet is comfortable. For a recent project, students were asked to design portraits of characters in a novel they had read. Students then scanned in the pictures and we used a stylus for those that needed editing. This allowed the students to focus with precision on the areas on which they were working.

Graphic arts teacher Barbara Smith has been able to show students stylus drawing techniques that were not possible before. She is also amazed at how software comes to life once you

have the functionality of the stylus. For example, in Adobe Photoshop, your control of the software is incredible once you begin using the stylus.

Modern language chair Pat Freund said, "In our school, the laptop computer and wireless systems are essential components for modern teaching/learning. However, the latest advancement in computer technology, the tablet laptop, provides additional useful options for teachers and students alike.

"Each week in my French III Honors and French IV Honors courses the students complete a writing assignment. These assignments range from formal compositions to creative writing. My students are required to place their assignments in the digital dropbox in Blackboard. The tablet laptop I have been using this year has enabled me to electronically access their work, correct it, and return it. Additionally, students are able to express themselves using colored fonts, clip art, photos, and even music. With the tablet and electronic access it is possible for me to evaluate the assignments in the form that the student intended to submit. My job is easier because I can edit their copies manually using the tablet stylus—circling errors and offering suggestions."

### The Future of Tablets

Tablet PCs extend the possibilities of notebook computers most commonly used in classrooms. Tablets can be used in both horizontal (landscape) and vertical (portrait) modes. Portrait mode is particularly useful when using material from books in a presentation.

Tablets are often lighter and have longer battery life than traditional laptop computers. Laptop-using teachers find it easy to transition to a tablet, and less experienced teach-

ers will be assisted by educationally friendly ink-enabled applications. Teachers are already developing innovative ways to use this technology and share their ideas.

However, this technology has a few drawbacks. The pricing of tablets is still higher than laptop computers. Because of the need for thicker layers of screen protection, some of the screens can be difficult to see under certain lighting conditions.

The next stage for our school is to expand our investigation and put tablets in the hands of our student population. Wherever we decide to start, we believe the ink-enabled tablet will have an enormous effect on the way students learn and teachers teach.



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